



## Grand Challenge Rules Q&A

Last updated October 8, 2004

This is a compilation of answers to questions received in the Grand Challenge mailbox since August 2, 2004. Neither the questions nor the answers have been edited except to delete identifying information. The date of each reply is listed. Questions are in italics.

The Grand Challenge 2005 rules were published on October 8, 2004. However, the preliminary rules were published on August 2, 2004. The October 8 version is in effect and takes precedence over any earlier versions.

The answers below clarify the rules or provide additional information on issues not addressed in the rules. These answers are not intended to contradict, supersede, or nullify anything contained in the rules. Please send questions to [GrandChallenge@darpa.mil](mailto:GrandChallenge@darpa.mil).

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*I heard somewhere that even if the DGC is won in 2005 that DARPA will hold the event in the years to follow – up to 2007/2008. Is this so? Any plans to hold the race numerous times?*

Congress authorized the Secretary of Defense to award prizes up to the year 2007. At the current time, our attention is focused solely on the 2005 event and we are excited by the strong likelihood that a team and its vehicle will successfully complete the course.  
8/2/2004

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*sir/madam*

*is it possible to become a us citizen by may 2005 or should i start looking for us partners. thank you for your time*  
*craig.p*

For information on U.S. Citizenship requirements, please visit the U.S. Citizenship and Immigration Services' website: <http://uscis.gov/graphics/index.htm>.

At the same time, we would suggest that you also begin looking for U.S. partners. To assist in this process, we would recommend that you visit the Discussion Forum located on the Grand Challenge website: [www.darpa.mil/grandchallenge/discussion.html](http://www.darpa.mil/grandchallenge/discussion.html).  
8/2/2004

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*Do you allow Canadians to participate to your Darpa Challenge?*

We would refer you to Section 2.1 "Team Membership" of the DARPA Grand Challenge rules issued on August 2, 2004.

8/4/04

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*In the eligibility section, the current rule states that the team leader must be a US citizen. This is the same rule as last year. Yet when I requested clarification on the matter last year I was told that being a US permanent resident (green card) was OK as well. Can you please clarify the rule on this matter (is this US citizen only or US citizen and US permanent resident) ?*

For Grand Challenge 2005, only U.S. citizens are permitted to be team leaders.

8/18/04

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*If I read well you rules, if we have a US citizen as a leader (which we have), so it means that we can register our team. Please confirm.*

Yes, if you have a U.S. citizen as a team leader you may submit an application for your team.

8/18/04

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*I would like to know if you will accept foreign team to participate the Grand Challenge.*

We would refer you to Section 2.1 "Team Membership" of the DARPA Grand Challenge rules issued on August 2, 2004.

8/18/04

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*We are now reg for the #1 with a team #. We need to get our DARPA logo. Sponsorship promos are ready to go. Can we copy off the net or are u going to send us one. We can not wait much longer. Thank you*

Unfortunately, DARPA can only send a high-resolution copy of the Grand Challenge logo after we receive both Parts 1 and 2 of your team's application, in full. As soon as we receive all Part 2 materials for your team we will send you the file, along with the guidelines for its use.

8/20/04

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*I've got a question about Part 2A of the application.*

*Item #1 asks to provide a team description & list of sponsors.*

*Item #2 asks for a list of team members, which can be changed at a later date.*

*Can information submitted for item #1 be updated at a later date?*

Yes, information submitted for Item #1 on Part 2A of the application can be updated any time up to the deadline of February 11, 2005. There will also be additional opportunities for further updates should your team advance in the qualification process.

8/20/04

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*XYZ is interested in participating in the 2005 Grand Challenge. We understand that we cannot register if we plan to use IR&D funds. We were wondering if this is due to the prize money from DARPA. We are not really interested in the prize money but rather in the experience and opportunity for our staff. Could we participate in the Grand Challenge on IR&D funds if we waive competition for the prize?*

XYZ must follow the same rules as any other team, which means government reimbursed IR and D funds cannot be used to participate in the Challenge.

Please understand that the funding restriction exists to give all equal opportunity at winning, and from what we hear from the teams it is not about the prize money but rather the recognition that comes from being the first across the finish line.

8/23/04

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*I will not be able to attend the Aug. 14 meeting. I intend to participate in the race and write about it in media outlets. Please send me the press kit and what other materials that might be available at the meeting since I will be unable to pick them up in person.*

All briefings presented at the DARPA Grand Challenge 2005 Participants Conference have been posted to the Team Resources page on the Grand Challenge website ([www.darpa.mil/grandchallenge/team.html](http://www.darpa.mil/grandchallenge/team.html)).

8/23/04

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*Are vehicles from the previous Grand Challenge eligible to enter in the upcoming event? Does a vehicle have to be designed and entered in the time period of a single Grand Challenge event, or could a vehicle be designed and constructed over a 2 or 3 year period for entry in a future event?*

Vehicles from Grand Challenge 2004 are eligible to enter Grand Challenge 2005. However, all teams and their vehicles will be required to meet all 2005 application and eligibility requirements whether or not they participated in and met the requirements of the 2004 event. The rules do not specify when a vehicle must be constructed.

8/27/04

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- 1) Can you elaborate more on what the content of the video should be. It is so vague right now that we don't know what you are looking to see.*
- 2) There has been some discussion on the forums about how to handle conditions where the route boundaries are narrower than the accuracy of commonly available GPS systems. Generally, it is understood that we should use the ground marking to stay on course (edge of the road or trail). Will there be barriers in these sections for us to follow?*
- 3) Can DARPA provide the teams with some base maps of the general area? Something so that all the teams are starting on a level playing field. These don't have to be highly accurate (somewhere between 1m and 3m resolution). This would help out some of the smaller entries, but the larger, well funded teams would still be able to purchase much higher quality maps (i.e. Carnegie Mellon).*

1. Information on the video demonstration (Part 4 of the application) and its requirements may be found on the Team Reference page on the Grand Challenge website ([www.darpa.mil/grandchallenge/team.html](http://www.darpa.mil/grandchallenge/team.html)) under both the "Team Application" and "Participants Conference Briefing Materials" links.

2. We would refer you to Sections 6.2.1 Waypoints and 6.2.2 Route Boundaries.

3. DARPA will announce the general location of the Grand Challenge 2005 route in the summer of 2005. However, DARPA does not intend to provide teams with maps or geographic data of the area.

8/27/04

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*With respect to the following section:*

*3.6.4 Manual Emergency Stop Unit*

*Each vehicle must be additionally equipped with an externally actuated manual emergency stop capability. Activating the manual emergency stop must promptly bring the vehicle to a complete halt in the DISABLE mode. At least one actuator and its labeling must be easily visible and accessible by an average human standing anywhere around the vehicle. The manual emergency stop must be easy to identify and activate safely, even if the vehicle is moving at a walking pace. The operation instructions for manual emergency stop actuators must be clearly labeled in English and Spanish. The instructions must not be interfered with by any other labeling or advertising. A demonstration of the manual emergency stop capability will be required as part of the NQE.*

*I ask the following:*

- 1. Is the above provision complied with by a standard power brake such as is usually and customarily activated by a common, ordinary brake pedal on a standard automobile that*

*is operated by the driver of a manned vehicle, or does it require some additional piece of equipment such as a button, lever or other control?*

*2. Is this complied with by, for example, a vehicle having ordinary controls such as a common brake pedal on the drivers' side of the passenger compartment of a passenger vehicle, but modified, say, so the doors are removed, allowing someone to simply jump into an operating, unmanned vehicle while it is moving and thus stop the vehicle simply by stepping on the brake?*

*3. The above says "externally actuated." Does this mean that the emergency stop must simply be accessible by someone on or in the vehicle (such as a person who gets into, say, a passenger compartment) as opposed to being inside of a control area, or does it require the emergency stop to be accessible from outside of the vehicle?*

*4. If an acceptable method for manual stop includes a standard, ordinary brake pedal as stated in question (1), obviously visible and accessible from a drivers' seat such that an ordinary person able to operate an automobile could use it, does it require labeling?*

*5. If the method for manual stop requires something separate from or in addition to a common, ordinary brake pedal as stated in question (1), is the manual stop method complied with by use of, for example, a lever which pushes or pulls directly or indirectly by other rods, wires or other devices on a common brake pedal?*

*6. Where an additional method is used for the method of manual stop either because it is chosen or required is something in addition to a common brake pedal, such as a lever or button, is the labeling requirement complied with by a sign saying something such as "Emergency Stop - Pull orange lever" or "Emergency Stop - Push orange lever" or "Emergency Stop - Push green button", (where, obviously, the device used for this purpose is a lever colored orange or a green-colored button), or must the object itself be marked with something like "Emergency Stop"? (The above indicates that it is required to be labelled in English and Spanish so presume the labelling includes both languages.)*

It is not acceptable for the externally-actuated manual emergency stop capability to require that a person enter the vehicle and engage a foot pedal. As the rule states, "at least one actuator and its labeling must be easily visible and accessible by an average human standing anywhere around the vehicle." For example, a vehicle based on a typical SUV might require an actuator on each side of the vehicle, perhaps several on each side. The intent of this capability is to enable anyone—a team member or just a bystander—to be able to stop the vehicle safely and quickly in an emergency. The rules do not specify whether the instructions for the manual emergency stop must be on or adjacent to the actuator. Each vehicle will be slightly different, but each must comply with the requirement that the manual emergency stop is clearly marked. It is likely that a big red button with a sign next to it that says, "emergency stop - push red button", would be fine.

The rules do not specify precisely what kind of actuator is required.  
8/27/04

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*Section 2.4 of the Preliminary Rules states that government money may not be used for the purchase or development of software or hardware for the Grand Challenge. The section continues to say "This exclusion does not apply to software or hardware that is commercially available or \*openly available\* to all teams on June 8, 2004 and through the duration of the Grand Challenge. (emphasis added)*

*As written, this rule also allows open-source, non-commercial software developed using government money to be used on challenge vehicles, as long as the software is freely available to all teams prior to June 8th, 2004, and throughout the duration of the challenge. At the Rules Meeting in Anaheim on August 14th, Dr. Tether addressed this issue by saying that commercially available software is legal, but open-source software would be decided on a case-by-case basis.*

*The Stanford Racing Team is requesting formal permission to use two such open-source software packages in the development and operation of our Grand Challenge vehicle:*

*1) Inter-Process Communication Toolkit (IPC)*

*Website : <http://www.cs.cmu.edu/~ipc/>*

*IPC is an open-source anonymous publish-subscribe messaging protocol used for inter-process communication in modular software systems. It was developed by Prof. Reid Simmons at Carnegie Mellon University with funding from NASA. IPC has over 100 users, has been ported to many different architectures and languages, and is thoroughly documented.*

*The latest manual, describing all of IPC's functionality, can be found at <http://www-2.cs.cmu.edu/afs/cs/project/TCA/ftp/ipc.ps.gz>. The source code and documentation for IPC has been available on the web since at least 2001. It is openly available to all Grand Challenge teams.*

*2) Carnegie Mellon Robot Navigation Toolkit (CARMEN)*

*Website : <http://www.cs.cmu.edu/~carmen/>*

*CARMEN is an open-source toolkit for robot navigation in planar environments. It was developed by Michael Montemerlo, Nicholas Roy, and Sebastian Thrun at Carnegie Mellon University with funding from the DARPA Mobile Autonomous Robotic Software (MARS) program. CARMEN has over 100 users at universities across the world, and is thoroughly documented on its website. CARMEN has been available on the web since 2002 and is no longer in active development, nor has it been since June 8th, 2004. It is openly available to all Grand Challenge teams.*

*In fact, DARPA provided a link to CARMEN from last year's Grand Challenge website in the "Team Resources/Links" section. This page is still available in the historical archive*

*section of the website which can be found at:  
<http://www.darpa.mil/grandchallenge04/links.htm>  
CARMEN is the first link in the list.*

*We await your decision as to whether these two packages can be used on our vehicle.  
With both software packages, we would restrict ourselves to using versions that were  
available from the aforementioned websites prior to June 8th, 2004.*

Based on the information you have provided, the use of these open-source packages is in accordance with the rules.

8/27/04

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*I have a design/system that potentially can run the entire course that works currently with UAVs. Do you allow a test run of the course by the vehicle prior to the event?*

The exact route for DARPA Grand Challenge 2005 will not be made available to the teams until 2 hours before the start of the event on October 8, 2005.

Note section 3.13 "Pre-Challenge Testing" of the Grand Challenge 2005 Rules, dated August 2, 2004: Testing of Challenge vehicles or components is the sole responsibility of each team. Any use of public lands for this purpose is at the team's own risk and must be in accordance with applicable local, state, and Federal guidelines.

Additional information regarding the Grand Challenge 2005 event, rules, and procedures can be found on the Grand Challenge website ([www.darpa.mil/grandchallenge](http://www.darpa.mil/grandchallenge)).

8/27/04

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*According to the definitions in the back of the rules a sponsor is defined as*

*"Team Sponsor - A team sponsor is an organization that contributes labor, materials, services, equipment, or funds to a team. "*

*Does this mean that a sponsor could contribute wages to team members so they could work full time to meet the objective? How does this basic idea work.*

A company may contribute wages as long as the source of the funding does not violate section 2.4 "Team Funding and Support" of the Grand Challenge rules. The rule applies to any funding and support the team receives and includes sponsors.

Please note that the final version of the Grand Challenge 2005 rules have not yet been published.

8/27/04

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*Is there any way to get a list of entrants from the Colorado area. I may wish to volunteer to work on a team.*

We would suggest two sources for the information that you are seeking:

1. The Grand Challenge Discussion Forum at [www.darpa.mil/grandchallenge/discussion.html](http://www.darpa.mil/grandchallenge/discussion.html)
  2. The Team Resources page on the Grand Challenge website at [www.darpa.mil/grandchallenge/team.html](http://www.darpa.mil/grandchallenge/team.html) which contains a listing of teams that have submitted applications to date.
- 8/27/04

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*The initial application process this time is an application, vehicle specification, and a video (and supplementary material as requested). What you want in each of these you will define later (probably at the Aug. 14 conference). Last year those teams that submitted applications and technical documents early (there were not many and I failed to be one of those), had their documents reviewed (in approximately two weeks) and comments were returned for them to improve the presentation. This year it is not as clear. If you wait until (near) the last minute, in all likelihood (barring crashes) one's bot will be performing its best and make the best video presentation, which appears to be your principal selection item. I assume one can submit early and send replacement videos as they become available, but is there any point in doing so?*

*The question is: Is there a reason to submit videos early? Will they be reviewed and comments returned? Will your judging process give credit to those teams that appear to be ready earlier? Or is it just as well to wait until near the end to the application period and submit your best video then?*

Information regarding the Grand Challenge 2005 application and the application process can be found on the Team Resources page on the Grand Challenge website: [www.darpa.mil/grandchallenge/team.html](http://www.darpa.mil/grandchallenge/team.html). This includes all of the briefings that were presented at the Participants Conference on August 14, 2004.

The deadline for submitting the video demonstration and vehicle specification sheet is March 11, 2005. Videos may be submitted at any time between now and the deadline. However, DARPA will not provide any comments or feedback to the teams during the review process and will not favor teams that submit early. On April 4, 2005, DARPA will announce teams selected for site visits.

8/27/04

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*Thank you for hosting the conference last weekend. I had asked a question about the tank trap specifications during Q&A.*

*Do you have any specifications now? I am interested in maximum and minimum dimensions.*

The picture of the tank trap/"hedgehog" used in the Conference briefing is representative of the type of man-made obstacle that DARPA might locate on the Grand Challenge course. Teams are free to infer rough dimensions and composition from the briefing slides shown. DARPA will not release detailed specifications for obstacles placed on the route.

Material presented at the Participants Conference is available on the Grand Challenge website at [www.darpa.mil/grandchallenge](http://www.darpa.mil/grandchallenge).

8/27/04

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*I have two questions on the preliminary rules publicized at your web site.*

*1. It says the team leader must be a US citizen. It differs from the last rules for the Grand Challenge 2004 which allowed team leaders who are permanent residents of the US. Is this difference due to a typo or an intentional change from the last rules?*

*2. Is there a limitation of the age of the team leader? Specifically, can a young man of age 15 be a team leader with some other team members of ages over 20?*

In response to your questions:

1. The U.S. citizenship requirement for the team leader in the Grand Challenge 2005 rules is indeed a change from the 2004 rules.

2. DARPA intends to set a minimum age of 21 for team leadership. The minimum age requirement will be reflected in the final version of the rules.

8/27/04

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*Subject: Manual for the E-stop, Where can I find it? If you could send me it's location?*

Literature on the safety equipment used during Grand Challenge 2004 can be found at <http://www.omnitech.com/DGC.htm>. We have not yet made a decision regarding equipment for Grand Challenge 2005.

8/27/04

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*How do I register for the race. Is there a calender of events?*

Information on Grand Challenge 2005 -- including the rules, application, and a calendar of events -- can be found on the website (<http://www.darpa.mil/grandchallenge/>).  
8/30/04

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*Your Rules Read . . . .*

### *3.8 Electrical Provisions*

*Challenge vehicles will need to accommodate the DARPA-provided E-stop receiver and tracking unit with associated antennas. The E-stop receiver will require a nominal 12 VDC power input which can range from a minimum of 10 VDC to a maximum of 14 VDC. The tracking beacon will receive power from the E-stop receiver. The combined power requirement will be less than 50 W. Any mounting plates or interfacing connections for DARPA equipment will be supplied to all semifinalists with the E-stop units. Portions of the route may run next to high tension lines, with the associated potential for electromagnetic interference.*

- 1. With the advent of cell phone 'walkie-talkies' low power communications, etc., etc., etc., why have you put such a weight/power burden on the robotics?*
- 2. The details of the antenna/receiver are not shown - I assume they will be at some point when entrance is accepted. Is this correct?*
- 3. since determination can be made via light, ultrasonic, proximity devices, etc., is there any restriction to these as long as they stay within your rules for power & frequency, as well as FCC guidelines?*

In response to your questions:

- 1) Your points are well taken. DARPA is focused on end applications such as convoys where weight and vehicle power could meet these requirements. Vehicles should plan on meeting these requirements for the Grand Challenge 2005. The e-stop equipment described in the rules was chosen by DARPA in order to provide an appropriate level of safety.
- 2) You are correct, further details will be available at a later date in a procedures document to be posted on the Grand Challenge website.
- 3) The rules do not restrict these devices provided they may be operated safely.

8/30/04

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*Regarding the grand challenge rules, Rule 2.2 (below) states that teams receiving funding/support from foreign governments are not eligible to participate. Many New*

*Zealand educational institutes do actually still receive some government funding, does that mean that a team that works with an educational institute in New Zealand will be not able to participate?*

*Can you please advise the \_intent\_ of rule 2.2?*

Teams may not receive government support for the development, testing, and operation of their vehicle. Staff from government institutions such as a New Zealand university may work on a team provided they do not use government-owned equipment, government-owned facilities, and they do this outside of their salaried duties for the university.

8/30/04

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Because you asked multiple questions, we have answered them below in brackets after each paragraph.

*I have reviewed the rules and have several questions. By section, they are:*

*1.2 If two days are required to complete the competition, it seems the vehicles will be E-stopped. Are they left on the course overnight? What security measures will be in place? Are the teams allowed on the course to restart the vehicles? This is more complex than resuming from a pause since all systems will have to shut themselves down and restart.*

[DARPA will provide security for vehicles left on the course overnight. The teams must ensure that the procedures for restarting the vehicle are simple enough that a government liaison can be trained to start the vehicle in the field without team members present.]

*1.4 Obstacles designed to disable tactical vehicles - What does this mean? By tactical vehicles I assume you mean the challenge vehicles. This term is neither defined in the glossary nor used in any other part of the rules. Are the obstacles obvious? meaning a large hole in the ground, a solid fence, or vehicle parked in the road? You don't mean anything like spike strips, land mines or barbed wire?*

[Please refer to the Participants Conference briefing that has been posted on the website for a sample photograph of the type of tactical obstacle we have in mind.]

*5.3 Based on the results of the site visit, DARPA will select and invite teams to participate in the NQE. - Based on what criteria? Evaluation criteria for video submission was included in section 5.2, but no evaluation criteria is given for the site visit. Also, is the intent to limit NQE participation to a specific number of vehicles, or will it be open to any vehicle demonstrating a suitable level of capability?*

[Please refer to the briefing on the website for a list of evaluation criteria and a sample video demonstration. For NQE, the field will be limited to approximately 40 vehicles.]

*5.5.2 A team's final score will be derived from its best two attempts. - How will the score be used: is the intent to limit GC participation to a specific number of vehicles, or will it be open to any vehicle demonstrating a suitable level of capability? Is the score based solely on the time taken to complete the run?*

[More details on the selection and scoring criteria for the NQE will be published in a procedures document on the website.]

*Also, why not use just the best score instead of the top two? A bad run will presumably drop the score of a team with an otherwise good run. If some teams get three runs, the bad run disappears, and an advantage accrues to that team over a team which got only two runs. Road racing qualification times, Indy and others, only use the single best lap time.*

[Thank you for the suggestion. Your comments will be considered along with others as the procedures are developed.]

*6.1p3 Start order will be announced at the end of the NQE. - On what is the order based? Inverse of the completion time?*

[Start order will be based on a number of factors, including performance at the NQE and event management and safety.]

8/30/04

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*We were wondering about the clause in the rules that stated: " A team (or Challenge Team) comprises two parts: a qualified team leader and any other individuals who have been appropriately designated by the team leader as team members in the application. Corporations or other organizations may participate as sponsors only. Etc..."*

*Can we, as a corporation participate? I know that Team Ensco was able to participate in the GC 2004 event and they are a corporation. Can you please clarify this rule?*

For Grand Challenge 2005, the team is comprised of a team leader and a group of individuals, all of whom may incidentally be corporate employees. Corporations participate as sponsors. The team leader may name the team after a corporate sponsor, may use corporate promotional materials on the vehicle, and may designate the corporation as the prize recipient. But the corporation itself is not a team member.

8/30/04

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*XYZ is a contract research organization in the Netherlands that would like to participate in the DARPA Grand Challenge through our sister organisation XYZ America which is a registered US company.*

*I have questions regarding the rule 2.4 that states*

*1. No funding used in the design, development, or operation of my team's Grand Challenge vehicle has been or will be charged to a grant or contract from a government, either directly through contract work or indirectly through government-reimbursable research and development, overhead, or general and administrative accounts. This restriction includes funding to pay for labor, travel, equipment leases, or other services that are applied directly to the design, development, or operation of the Challenge vehicle. 2. No portion of the software or hardware used on the vehicle, including the vehicle itself, has been or will be paid for, wholly or in part, using government funding. This exclusion does not apply to software or hardware that is commercially available or openly available to all teams on June 8, 2004, and through the duration of the Grand Challenge.*

*My questions are*

- XYZ's autonomous vehicle has been constructed in the past using internal money from the company. There is of course an indirect relation with our prime customer the Netherlands Ministry of Defence. Will this prevent us from participating?*
- We plan to combine efforts with Dutch universities. Is this possible in view of the restriction on government funding?*
- If we are not allowed to enter the race as a normal team, is it possible to enter the race outside the competition, i.e. without being eligible for the prize?*

*I hope that it will be possible for us to join the Grand Challenge. We believe that we are in a similar position as the Israeli company Elbit Systems Ltd. that participated in the previous Grand Challenge.*

A vehicle that was constructed entirely from corporate profit without any support from government contracts (including overhead charges) is acceptable for participation in the Grand Challenge. Individuals from government-supported universities may participate, but cannot do this as part of their salaried duties for the University.

However, based on the information you have provided it is not possible to give you a ruling on whether or not your team is eligible for Grand Challenge 2005. Please provide more detail regarding the funding for your vehicle, and your team's relation to any national government entities.

Regarding your last question, we do not have a special category for teams that are not interested in taking the prize.

8/30/04

*Hello. I am writing in regard to the contest eligibility from the August 2, 2004 preliminary rules*

*Section 2.1 Team Membership states "the team leader must be a US citizen". Would Darpa consider changing this rule in future events? I have been enthusiastically following the first grand challenge have put together a team to enter future events. Everyone on the team, including myself as team leader, is Canadian.*

*Many times in the past our nations have joined forces to push the boundaries of modern technology. Partnering in everything from the space program to medical science, no two countries have built closer ties than US and Canada. It is my hope the rules can be altered to allow us to compete in this challenge and continue our long heritage of pushing the envelope of science as partners.*

*It is too soon to tell if any events will be held in the future or what the rules might be.*  
8/30/04

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*The limited time at the competitors meeting prevented me from taking a microphone, but I feel these questions are important/good enough to warrant response from Darpa:*

*-I already have a vehicle operating . Even before the new rules were announced, I was planning on submitting video footage of my robot. If the video demonstration is good enough, i.e. show vehicle navigating 20 MILES OF FIRE ACCESS ROADS at 30 mph, and the entry is extensively demonstrated in the tape and documented to DARPA, might we skip the site visit? My understanding is that the purpose of the site visit is to prevent 'bluffing' in technical papers, not to prevent an out-and-out fraud, where someone is bold enough to actually be secretly remotely driving the vehicle shown in the videotape. I doubt anyone would be THAT dishonest. I'm not asking DARPA to skip my site visit, I'm just asking that if DARPA finds my vehicle entry competent on the basis of the videotape and documents alone, just to be open to the possibility of skipping a particular site visit. And only if DARPA has no doubts about the competence of my vehicle. The reason why this is a concern to me is because it would really represent an extra 3 days or work going to my testing area, solely for the site visit.*

*-My understanding is that Coast guard (free) DGPS correction on top of a WAAS unit is minimally acceptable. Please verify. At the conference it sounded like one of the speakers was saying that a WAAS GPS-only entry meant automatic rejection. I don't think he was merely saying what kind of GPS was needed 'to succeed,' I think he was saying what basic requirements DARPA needed to see on the first couple application forms.*

*-Last question. This might sound silly, but I'm dead serious. I have a couple hours of battery capacity in my vehicle. I will have a loud, 2-stroke engine for my onboard generator, that is loud enough to meet the siren requirement. If I intermittently stop and start the generator so as to meet the rules for sirens (e.g. run the siren for so many*

*seconds as a warning before accelerating, turn off the siren during certain types of e-stops), can I use this running engine exhaust as my audible warning signal? The rules really don't prevent this, but they do mention the siren has to be "intermittent," I don't know if this means the siren has to be selectively activated only in certain circumstances, or if it means the TONE has to be intermittent. I ask this question because my vehicle is something small like the Rover Systems vehicle, and I have to budget carefully for electrical power, and that siren does make a difference.*

In response to your questions:

- 1) Our plans for site visits will apply to all entrants. We do not intend to make any exceptions to this.
- 2) There is no minimally acceptable type or accuracy of position location device. The rules give general guidance and we do not anticipate publishing more specific language.
- 3) Sorry, but this use of the generator engine would not satisfy the requirement for the audible warning device. The purpose of the audible alarm is to alert people in the vicinity of the vehicle that it is enabled for autonomous operation. The use of a generator engine would not serve as a warning to someone who hears it and therefore would not serve its intended purpose. The audible alarm should produce an intermittent tone whenever the vehicle is enabled for autonomous operation.

8/31/04

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*The 04 rules also allowed permanent residents i.e greencard holders to be teamleaders. it would be nice if this could be included in the 05 rules*

We do not anticipate changes to the team leader eligibility requirements published on August 2nd in the Grand Challenge 2005 preliminary rules.

8/31/04

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*The Company I work for is a DOD contractor. Because all my benefits come either directly or indirectly from the contract with the government. My leave falls into the "Not using government funds" issue.*

*At the DGC conference, I asked this question, the resolution was to email the question and get the written response that we can use leave to participate in DARPA Grand Challenge events.*

We intend to clarify the restriction on government support when the final rules are published. You can expect to see language that permits your situation.

9/1/04

*Could you please answer the following question:*

*Is there a minimum ground clearance required/recommended to complete the course or will all obstacles be avoidable? In other words, will GC vehicles be required to "roll over" (or "climb over") any natural or man/made obstacles along the course?*

*The "standard pickup" is a bit vague in reference to ground clearance and standard pickup trucks vary widely in this regard. Because of this vague reference, I am assuming that we won't be forced to climb over any football-sized rocks (and/or crush any shrubs or bushes along the way) and that we can navigate around them instead. Is this correct?*

The exact route has not yet been determined but we are confident that the following will provide you with sufficient information to construct a vehicle that can handle the terrain it will encounter:

- Section 1.4 of the rules (<http://www.darpa.mil/grandchallenge/rules.html>) describes the route
- Section 3.2 of the rules describes vehicle limitations
- Sample route photos were shown at the Participants Conference (<http://www.darpa.mil/grandchallenge/ParticipantsConference.html>)  
9/1/04

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*I am leading a team interested in competing at the 2005 DGC, but my status is Permanent Resident. I would express my desire to be the team leader of my own team when interacting with DARPA, despite my status of Permanent Resident.*

We do not anticipate changes to the team leader eligibility requirements published on August 2nd in the Grand Challenge 2005 preliminary rules.  
9/1/04

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*I notice you dropped the 'permanent resident' status as being a qualifier for team leaders. Is this intentional, or would permanent residents still be acceptable as team leaders?*

*I was looking at forming a team with my brother as team leader (who is a US permanent resident), amongst others (I am a UK citizen). His wife is a US Citizen, but due to her work would not be sure she could be available at specific dates.*

Dropping the "permanent resident" eligibility was intentional and we do not anticipate further changes to team leader eligibility requirements that were published on August 2, 2004, in the Grand Challenge 2005 preliminary rules.  
9/2/04

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*hi im going into your competition and was wondering if my machine malfunctioned and started destroying other teams vehicles would i be liable for any punishment due to that*

Safety is an important part of the DARPA Grand Challenge. If you have a vehicle that may potentially malfunction and destroy other vehicles, please indicate this in the Vehicle Specification Sheet and bring it to the attention of the officials at the site visit.

9/2/04

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*If the vehicle is paused for a long time, is it allowable to have the engine turn off and turn back on when the vehicle is enabled again?*

*Secondly, I'm assuming from the updated RDDF format that there are no phase line waypoints this year.....?*

The rules do not prevent a vehicle from autonomously stopping and restarting its engine. However, when a vehicle is in PAUSE mode, the warning light must continue to operate and the brakes must continue to hold the vehicle in place in case it is stopped on an incline.

Rule 3.6.3 states: "The PAUSE mode brings the motion of a vehicle to a prompt stop, ready to resume forward motion when the PAUSE signal is removed." We anticipate that this rule will be unchanged when the final rules are issued.

The RDDF will not contain phase line waypoints.

9/2/04

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*The conference in Anaheim went very well. I have a few questions about funding and equipment that I'd like archived in email:*

*1) My company, XYZ, is doing research for DARPA (we have a Phase I SBIR) and we are also leading "TEAM-ABC" with the University of ABC. We are of course not using any funds from our government related work for the DGC. Are there any other issues limiting our ability to compete?*

*2) May a university use property it owns that was originally purchased using expired government contracts?*

*3) May a university use property purchased under active government contracts?*

*3) May a university use property purchased using active government contracts if that equipment is generally available to university students (say in a class for instance) and not being used for government research?*

In response to your questions:

1. The rules are specific about all the ways that a team needs to be careful to avoid using government support for their vehicle. This includes restrictions on funding, but also on wages, equipment and other forms of support.
2. The rules do not restrict the use of equipment that is owned by the university, even if it was originally purchased under government contract.
3. The key issue is ownership of the equipment. If it is owned by the Government, it may not be used.
4. For equipment, the key issue is the ownership of the equipment, not the use in terms of government research or classroom use. Therefore, equipment can be used for Grand Challenge if the university owns it.

9/2/04

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*Can a company currently doing work for DARPA compete in the Grand Challenge?*

According to the rules, a team consists of a team leader and any number of members. A company may participate in Grand Challenge as a sponsor only. The source of the sponsor's funds is the key issue. The rules give guidance regarding acceptable funding and support. By itself, current work for DARPA would not prevent a company from sponsoring a team.

9/2/04

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*Great conference! Thanks!*

*It was emphasized that a wireless network would not be allowed. As I understood it, no data emissions are allowed.*

*Question: Would there be any allowance for wireless tire pressure/temperature sensors under xx milliwatts? Or does the vehicle have to be data-emission silent? (The tire sensor is mounted within the wheel for monitoring pressure/temp.)*

*For sample sensor: <http://ww1.microchip.com/downloads/en/AppNotes/00238b.pdf>*

Any wireless systems must be disconnected prior to the departure signal at the NQE and Grand Challenge Event. This includes the use of wireless sensors mounted with the wheel.

9/2/04

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*I have a problem. As you may be aware, I have (had?) every intention in the world in putting together a decent Grand Challenge entry. I have a problem with the video part. My approach to this had to be different because of several reasons, the main one being a shortage of cash. I came up with building a smaller model vehicle to start software and hardware development \*then\* when I do sponsor-hunting, not only have something to show them that works when I ask them for support but be ahead of the game if I had to wait for this support to start the real work. I propose this: in my case, the video will show the real entry that, at that time, will prolly not work at that time. The video will show the the model working as well. Doable? I should have no problems being ready for a site visit..if I get one in May to demonstrate the real thing. The model will have everything the real entry will have...and, of course, the software will be exactly the same as well. The model construction is already underway and I should be able to start contruction of the real vehicle in December. Thanks.*

DARPA's review of each video demonstration will, among other things, evaluate the capability of the vehicle that will be entered in the Grand Challenge. Demonstrating a model might give some indication of your team's capability, but it could also call into question your team's ability to have a working vehicle by the time of the site visit. At present, we can not know the capability of the other teams against which you will be competing. Therefore, it is not possible to issue guidance on precisely what is needed in the video in order to get a site visit. You should show your vehicle at its best.

9/2/04

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*In slide 24 of 39*

*<http://www.darpa.mil/grandchallenge/Participants%20Conference/Rules.pdf>*

*Where are the lateral boundaries associated with these way points?*

The sketches are intended as rough examples of what might be acceptable if a vehicle inadvertently strays from the route (L) and unacceptable if a vehicle intentionally cuts the route short (R). In the examples, the lateral boundary might be consistent from waypoint to waypoint or it might vary.

9/2/04

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*One of our team members is an vocational automotive instructor for XYZ County public schools. We had planed to do the vehical construction at the school, however this public school gets part of its funding from "XYZ Vocational and Technical Education Act, Public Law 105-332". The building and equipment are owned and operated by XYZ County, but no one knows what equipment was purchased with this grant.*

*We plan to use the automotive equipment for the construction phase of the vehical and the team will be paying for all matirals used in the contruction. The optics, computer hardware and software will be installed at a private location.*

*Please advise if this would be violalation of the federal funding rules.*

The use of buildings and equipment wholly owned by XYZ County would not violate the team funding and support restrictions as outlined in the rules and in Part 2B of the application.

9/2/04

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*I am part of a team that will be registering for the DGC 2005. We currently have 6 members in our team. The 6 members of our team would like to not compete in any events on a Sunday, for religious reasons. We are aware that the final Grand Challenge event may run into Sunday if there is not enough daylight, which is a situation we will make a decision about if that should eventuate. However, for the NQE, we would like to know if we may submit a request to be scheduled on days other than Sunday.*

*Secondly, our understanding of the role of team leader is that they are the official contact point for DARPA, that they must be present at all events, and that they are legally responsible for the disbursement of any prize money. From DARPA's point of view, if the team is actually lead by a non-US citizen, but the official team leader (as registered with DARPA) is a different team member who is a US citizen, will that cause a problem? Is the team leader merely a legal formality?*

Any team may submit a request for religious reasons not to be scheduled for NQE times on a particular day of the week. We will make every reasonable effort to accommodate this request as long as it is fair to the other teams.

Eligibility requirements and responsibilities of the team leader are described in the rules. The rules document defines the team leader as:

"A team leader is the single individual US Citizen identified to DARPA during the application process responsible for the following: Primary point of contact for team communication with DARPA, signatory of the Certification of Team Funding and Support, signatory of the site visit Agreement, presence at all stages in the Qualification process, and identification of prize disposition (should the team be successful)."

These requirements are mandatory. However, the rules do not detail the team leader's role within the team and we do not anticipate doing so.

9/2/04

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*In section 6.2.1, does the lateral boundary apply to the corridor leading up to the waypoint associated with the boundary or to the corridor from this waypoint to the next one. Section 6.2.3 defines the speed to be from the associated waypoint to the next one. I would assume this would be the same for the lateral boundary but I wanted to be sure. Also, is the boundary width from the starting point to the first waypoint defined?*

Yes, the LBO and the speed cover the same section. It applies to the route segment from the associated waypoint to the next sequential waypoint. We will issue updated rules with language that clarifies this.

The boundary of the route from the start chute to the first waypoint is not specified. We have not yet determined the route or the precise configuration of the start area so it is not currently possible to provide additional information but the last event should serve as a rough guide. For Grand Challenge 2004, the first waypoint was approximately 100 feet from any of 6 start chutes. There were no obstacles of any kind between the start chutes and the first waypoint, and the area was bounded on both sides by easily detectable highway barriers.

9/2/04

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*Will the team have access to the vehicle after it's checked in? If so, when and how often?*

*Can Federal employees act as team leaders?*

If you are referring to the NQE, teams will have access to their vehicles during hours that the garage area is open for business – at least 12 hours per day. Teams will be restricted from accessing their vehicle while the vehicle is in autonomous operation on the qualification or practice course.

Employees of the federal government may participate in Grand Challenge 2005 as long as they comply with all rules. There are no rules specifically prohibiting employees of the federal government from being team leaders.

9/3/04

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*What is the required range of the e-stop to work within?*

*How many waypoints will be given for the Challenge?*

E-stop units are furnished by the government. Their specifications and capabilities, including range of operation, will be provided at a later date.

The RDDF from Grand Challenge 2004 contained more than 2500 waypoints. The route for Grand Challenge 2005 is still in development.

9/3/04

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*This really is't about application status but can canadian teams also enter into the challenge?? If you could get back to me with an answer that would be great.*

The Grand Challenge 2005 rules require the team leader to be a U.S. citizen. The rules do not place citizenship requirements on team members or specify the country in which the vehicle must be constructed.

9/7/04

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*Where exactly will the event be held also is there a cost for spectators.I have been following this event and find it every fascinating.I would like to attend please send me all the details nesaccary to attend.*

DARPA has not yet determined the exact location of Grand Challenge 2005. At this point, we can tell you that it will be held on October 8, 2005 in the southwest U.S. There will not be an admission fee for spectators and additional information can be found on our website ([www.darpa.mil/grandchallenge](http://www.darpa.mil/grandchallenge)) when it becomes available.

9/7/04

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*Is itthere going to be a place for folks who are fans of robots but not involved with any specific team to come and watch this year?*

There will be locations for spectators to view the Grand Challenge 2005 event. As the event draws closer, look for information on the website at [www.darpa.mil/grandchallenge](http://www.darpa.mil/grandchallenge).

9/7/04

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*Last time support from state, county, city, Indian nations, and foreign governments was OK, has that changed?*

Section 2.4 (Team Funding and Support) of the Grand Challenge 2005 preliminary rules dated August 2, 2004, states, in part:

"For purposes of this certification, government funding denotes any form of support from a national or international governmental organization, whether located in the United States of America or in any foreign country or territory."

Governments of states, counties, cities, and Indian nations may support Grand Challenge teams.

9/7/04

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*It would help us talk about our vehicles when working on fundraising if we had numbers for them. Would it be possible to get vehicle numbers now?*

DARPA will issue numbers to all semifinalist teams before the National Qualification Event.  
9/8/04

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*In addition to the below question, I have reviewed the OSHA rules regarding laser safety but can find no indication of acceptable laser power limits (other than obviously no fire-starters) for use in the Grand Challenge.*

*I am considering using lasers that include various optical wavelengths -- some of these are Class IIIA lasers. Are such acceptable for use on Grand Challenge vehicles?*

*According to OSHA Technical Manual, Section III, Chapter 6, Item VI-C:*

*"CLASS I, CLASS II, CLASS I.A., AND CLASS IIIA LASERS. Accident data on laser usage have shown that Class I, Class II, Class I.A., and Class IIIA lasers are normally not considered hazardous from a radiation standpoint unless illogically used."*

*Would such a Class IIIA laser be allowed on a GC vehicle?*

A Class IIIA laser is allowed, provided that OSHA requirements for logotype labeling are met (including Caution or Danger labels), and provided that limited controls are implemented to prevent illogical usage. See OSHA Technical Manual, Section III, Chapter 6, especially Paragraph IV.B.2.d and Paragraph VI.  
9/8/04

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*Your preliminary rules in section 2.3 state that US government organization and agencies are ineligible to participate. Does this refer to government employees only or does it also preclude government contractors from entering. For example XYZ Corp. is the prime contractor for a National Lab. - are they ineligible?*

Section 2.3 prevents neither government employees nor government contract employees from participating in Grand Challenge. It only prevents US Government organizations or agencies from participating as team sponsors. According to the rules, an organization can not be a member of a team. An organization may participate only as a sponsor. A team consists of any number of individual members, one of whom is the team leader. The paragraph goes on to describe, in order to avoid confusion, how US Government employees are allowed to participate. The more detailed restrictions in section 2.4 specify funding and support that are not permitted. All team members are bound by these restrictions.

Any company may support a Grand Challenge team using its profit or funds from contracts not associated with the US Government. US Government contract employees may support a Grand Challenge team as long as they do so on their own time and do not use any US Government resources.

9/9/04

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*I've only recently been made aware of the DARPA Grand Challenge and have reviewed some (but not all) of the web pages on your site. I would like to get involved, but do not know who to contact. Is there a list of teams and contact or location information for each team available. I've located 3 teams from my own research, but recall seeing that as many as 33 teams have registered for this year. I've also sparked some interest from some associates and we would like to communicate with a few of the teams to see if any of us would fill volunteer or sponsored positions on their teams.*

*Any contact info, or official list of teams and contact info would be appreciated.*

A list of teams that have submitted an application for Grand Challenge 2005 can be found on the website under 'team resources' > 'team application status'.

9/10/04

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*We are seriously considering a Grand Challenge entry from XYZ Corp - an FFRDC. We will be talking to our senior Corporate Officers and our legal staff and need two questions answered.*

*1) They want to know why DARPA is disallowing IR&D funds. We have heard all sorts of rumors and they said they would like to know.*

*2) They are also concerned about making sure we are working in accordance with both the FAR and our FFRDC regulations. In order to do that they wanted to know what the contracting vehicle would be used for dispersing the grand prize and what's the source of the funds.*

With regard to your question concerning IR&D funds, team funding and support restrictions result from a policy decision by DARPA leadership.

The prize will be awarded in the form of a check made payable to the leader of the winning team or to any entity or account specified by the leader of the winning team and does not require a contract vehicle. Authority to award the prize comes from Congress.

9/10/04

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*Rule 3.6.4 requires manual cutoff switches on the various sides of the vehicle. There are two basic ways to accomplish this. First one is a switch to a relay which disconnects the*



*battery and two, a physical plug that is pulled to disconnect the battery wire. Can we use either one or does DARPA have a preference?*

Section 3.6.4 (Manual Emergency Stop Unit) of the Grand Challenge rules specifies the effect that must result from activating the externally-actuated manual emergency stop. It states:

“Activating the manual emergency stop must promptly bring the vehicle to a complete halt in the DISABLE mode.”

Additionally, section 3.6.3 (Wireless Emergency Stop Units) describes the DISABLE mode as:

“The DISABLE mode brings the vehicle to a prompt halt and shuts down all systems while actively applying and maintaining the brakes.”

How this is accomplished by each vehicle is left up to each team. Contrary to the subject line on your message, note that it is not simply an electrical cutoff switch.

9/10/04

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*Concerning the waypoints, will the specific distance the vehicle has to get to a waypoint be variable? That is, in order to be considered to have reached it? Just how much concern is the DARPA controller going to be giving a vehicle? It would bother me if they were constantly stopping the vehicle when they thought it might go over a bridge or something. For something that would simply damage or destroy the vehicle, I would rather they wait and find out rather than impose their own judgement on the software for something like that. Pedestrians and civilian vehicles are another matter...I understand that. However, would there be any way I'd be allowed to transmit the 3D model of the environment as the vehicle understands it and the associated planned course in yellow arrow format to the controller so they could see it on a monitor screen in their vehicle? This would be nice as well for airing during the event. It would make it very media friendly. Note: I'm not concerned with getting outside information to the vehicle in any manner, but simply seeking to gain more understanding from you guys as to what the vehicle is thinking. The media aspect this would give the event would be definitely worth pursuing as well. Those 3D models and the associated logic could be made pretty presentable. They could also be made to appear somewhat like human thought processes..."I've got 9 hours remaining...50 miles, terrain obstacle density and..." you get the picture.*

The rules state that the combination of the waypoints and the lateral boundary offsets defines the corridor through which the vehicles are required to travel. Waypoints serve as a device to mark where one route segment ends and the next begins and to specify the next segment's lateral boundary offset and maximum speed. Judges will monitor each vehicle's location in relation to the route boundary whether it is near a waypoint or not. Briefing slides from last month's Participants Conference are on the Grand Challenge

website at <http://www.darpa.mil/grandchallenge/ParticipantsConference.html>. Slide 24 of the rules section has more information on waypoints. Regarding this slide, note that the sketches are intended as rough examples of what might be acceptable if a vehicle inadvertently strays from the route (L) and unacceptable if a vehicle intentionally cuts the route short (R). In the examples, the lateral boundary might be consistent from waypoint to waypoint or it might vary.

On the actual route, the lateral boundary offset associated with each waypoint can vary from one to the next but it is likely that the offset at many waypoints in sequence will be identical.

Vehicles may not transmit any data other than from the e-stop unit and tracking system furnished by DARPA. Thank you for your suggestion regarding monitoring vehicles.  
9/10/04

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*I am a development researcher for XYZ Productions, a documentary television company based in Montreal, Canada.*

*Can you please send me a list of the teams which have already applied for the Grand Challenge 2005 and the contact names and telephone numbers for those teams.*

The Grand Challenge website at [www.darpa.mil/grandchallenge](http://www.darpa.mil/grandchallenge) contains a list of current applicants, just click on 'Team Resources' and look for 'Team Application Status'.

*I should have been more clear, my apologies. The website only offers further information for those teams that have submitted Part 2 of their application. I was hoping to get contact names and telephone numbers for the teams that have only submitted Part 1.*

The information contained on the website is all we are distributing. When a team submits part 2, their contact information is posted on the website.  
9/16/04

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*are there any rules which limit the amount of sponsor signage on the vehicle or elsewhere?*

Section 3.5 (Vehicle Identification Number) of the preliminary rules states, in part:

"Teams are allowed to obtain sponsorships and to display advertising if such advertisements are not considered inappropriate or offensive by the Officials. The DARPA Grand Challenge 2005 logo may be displayed on each vehicle."

Additionally, any advertisements or other signage on the vehicle must not obscure the vehicle's number.

We are unclear regarding the last part of your question, specifically the word "elsewhere".

9/16/04

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*Is the use of ADFs (Automatic Direction Finders) and NDBs (Non-Directional Radiobeacons) authorized? Also, how do we obtain a copy of last years way points? Thank-you.*

If you are referring to aviation navigation signals, the following extracts from the preliminary rules might apply to your question:

3.1 (Autonomous Vehicle Behavior Requirement): "No team may cause a signal of any kind (e.g., visual, RF, or sonic) to be sent to a vehicle nor may any vehicle receive or transmit a signal of any kind (except those explicitly permitted in Section 3 of the rules) while on the NQE course or the Challenge route."

3.2 (Vehicle Limitations): "Apart from the emergency stop feature, tracking signals from DARPA-provided systems, and freely available navigation signals, no external communication is allowed."

Regarding the RDDF, DARPA produced two Route Definition Data Files (RDDF); first, the Qualification, Inspection and Demonstration (QID) file that covers private property and second, the Grand Challenge 2004 Event (GC04) file. The GC04 route file defines the geographic locations covered by the DARPA Grand Challenge route for the March 13, 2004, event. The route lies within private property and on environmentally sensitive public lands. DARPA does not endorse use of the route or areas adjacent to the route. DARPA cautions all holders of the Event RDDF that the U.S. Bureau of Land Management and U.S. Fish and Wildlife Service have established detailed rules and regulations regarding the use of public lands. These rules should be followed at all times.

Please find attached two files: 1) the QID RDDF and 2) the GC04 RDDF.

*since ADF and NDB signals are "freely available navigation signals" we should assume the answer is YES, we can use them?*

We would caution you that the final version of the rules has not yet been released. When published, we expect it will make clear that vehicles may use navigation signals that are openly or commercially available. In order to give teams as much room as possible to innovate, the rules give guidance but can not specify all approaches and systems that are acceptable and all that are unacceptable. If there is some question as to whether a

particular approach or system is in doubt, a team should submit as much detail as possible and explain what in particular is in question.

9/16/04

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*I am the Leader of XYZ and would like to know if the use of a 2005 Yamaha Rhino 660 Auto. 4x4 as our basic vehicle would be acceptable? As far as we can tell, it passes all the vehicle limitations requirements. But it is not enclosed.*

*We are Software, Electronic and Sensor engineers, so, as far as the specific vehicle goes, we shall purchase one and if you would like to recommend a different vehicle, feel free. However, one advisor on the team has developed a 3-axis real-time machine controllers and he feels that we can develop adaptable control laws and to some extent, mechanical interfaces to the 4 vehicle movement control subsystems, no matter which vehicle we choose.*

*So, this is our plan and the Rhino seems to be the best vehicle for the job at this point. Lights are not needed since the race is not at night and an enclosure is not needed since the rules seemed to imply, even though it was not mentioned, that it would be delayed if there were to rain, which surely would cause the Event to not be completed safely.*

*Therefore, if we have to be able to operate in the rain, then we have to design rain management into everything; from the vehicle to every algorithm dealing with vision and speed.*

In order to give teams as much room as possible to innovate, the rules attempt to give a reasonable level of guidance but can not specify all approaches, vehicles, and systems that are acceptable and all that are unacceptable. If there is some question as to whether your particular approach, vehicle, or system is in doubt, you should submit as much detail as possible and explain what in particular is in question.

The rules do not state or imply that inclement weather would necessarily cause a delay in the event.

9/16/04

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*I am writing in hopes of finding a web site ,or list of the challenges, presented by DARPA, that i can search and find the one that im most suited to participate in.*

Currently, the only challenge event DARPA is sponsoring is the DARPA Grand Challenge for autonomous ground vehicles. For more information, go to [www.darpa.mil/grandchallenge](http://www.darpa.mil/grandchallenge).

9/17/04

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*Besides the Anaheim event this past August, are there other DARPA sponsored team meetings between now and next October where officially entered teams will be asked to participate?*

No group events are currently scheduled between now and September 27, 2005 — the first day of the National Qualification Event at the California Speedway in Fontana. DARPA will meet with representatives of each team selected site visits that will be conducted in May 2005. If any events are added to the schedule, information will be available on the Grand Challenge website at [www.darpa.mil/grandchallenge](http://www.darpa.mil/grandchallenge).

9/21/04

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*I have a two part question:*

*1. One of the designs my teammates and I have in mind is basically a large sphere. Being that a sphere has no top or bottom would an exception be made regarding the placement of the light bar.*

*2. If our vehicle is designed to cope with collisions, would it be given the opportunity to continue after colliding with an object (given that it does not damage it)? Also, if it were to begin to fall off a hillside, would it be given the opportunity to recover or would it be immediately disqualified?*

*Basically my question is: Is it ok to enter a spherical vehicle into the contest?*

Please be more specific regarding your warning light question. To what do you seek an exemption? The rules do not specify the placement of the light, just the effect that must result: “Each vehicle shall display one or more flashing yellow or amber warning lights, the combination of which results in visibility 360 degrees azimuthally around the vehicle.”

Regarding your second question, making contact with an obstacle without damaging it is not necessarily grounds for disqualification. It is impossible to examine all theoretical situations and determine whether a vehicle would be disqualified. A vehicle likely would be paused or disabled if it is doing something unsafe or appears to be in imminent danger of damaging the environment or infrastructure. It would likely not be stopped if it is going to do something that puts only the vehicle itself in danger. Your phrase “designed to cope with collisions” is unclear.

As for your last question, the rules do not explicitly prohibit a spherical object. Of course, it must comply with the rules. In order to give teams as much room as possible to innovate, the rules attempt to give a reasonable level of guidance but can not specify all approaches, vehicles, and systems that are acceptable and all that are unacceptable. If there is some question as to whether your particular approach, vehicle, or system is in doubt, you should submit as much detail as possible and explain what in particular is in question.

9/22/04

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*we at XYZ have formed a team for the GC 2005 competetion. we are in a stage of getting sponsors for our equipment. We recently presented to ece board at our college and we have a sponsor who is willing to lend us a military humvee just for the competetion. We beleive that this is a humvee that cant be bought at a dealerships, its modified to withstand rough terrain for military purposes. The question is that can we use this vehical for the GC 2005? and add our own equipments to it?. if not, the Second question is can we take advise from military personal on what kind of vehicle we could invest into for the grand challenge? and final question is, can we test our vehicle at a military site on their driving courses if we can get the permission?. thank you for your time.*

Section 2.4 (Team Funding and Support) of the preliminary rules contains guidance relevant to your questions. However, we offer the following comments:

- 1) A team may not use equipment, including a vehicle, owned by the government. A sponsor may not support a team with government-derived funds or with equipment, including the vehicle, that was purchased using government-derived funds.
- 2) Government employees, including military personnel, may participate as team members as long as they do so on their own time apart from any official duties and do not use any government resources.
- 3) Government-owned equipment or facilities may not be used in the design, development, or operation of the vehicle unless the equipment or facilities are available to all teams. This applies to test facilities.

In order to give teams as much room as possible to innovate, the rules attempt to give a reasonable level of guidance but can not specify all approaches, vehicles, and systems that are acceptable and all that are unacceptable. If there is some question as to whether your approach, vehicle, or system complies with the rules, you should submit as much detail as possible and explain what in particular is in question.

9/22/04

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*We are in the process of creating a team to participate in the Grand Challenge 2005. My brother and I attended the Participant's Conference in Anaheim in August. I understand that DARPA is very strict about teams not using federal government funds, lands,*

*facilities, or technology that is not available to all teams. I remember at the conference that in answer to a specific question the answer was "contact us to get clearance."*

*We are considering the use of the XYZ center, which is a research facility of the University of ABC, and as I understand has restricted access and may have contacts with the military. Before contacting them about a potential use of their site I want to check with you.*

*Here is a link to the history of the XYZ center:*

*Collaboration with the university and use of this facility may greatly enhance our chances of success, thanks for your thoughtful consideration of this matter.*

The Grand Challenge rules prohibit teams from using equipment or facilities that are owned by the US government unless the equipment or facilities are available to all teams. If the equipment and facilities you plan to use within the XYZ center are owned by an entity other than the US government, they would seem to be acceptable for use by a Grand Challenge team. It is your responsibility to research and determine ownership of equipment and facilities you plan to use.

9/23/04

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*The rules in section 3.6.3 state that the disable E-stop will "shut down all systems". Does this include the vehicle engine? It would be good to have the assistance of the engine vacuum to assist in braking. May we keep the engine running long enough to stop, and then shut off the engine?*

The rules state: "The DISABLE mode brings the vehicle to a prompt halt and shuts down all systems while actively applying and maintaining the brakes." Because each vehicle is unique, the rules do not specify exactly how quickly or in which order these events occur. The rules do not intend to create a situation in which a vehicle's brakes fail to function. But the rules do intend the vehicle's engine to shut down as soon as it is safe to do so.

9/24/04

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*The Rules I read stated that information about Vehicle Specifications would be on the Web Site however, I have not found them*

*Also, it was not exactly clear to me the "Area" of the 2005 Oct 8th Race. I read it to be California and Some of Nevada. Is that correct it can be in both States? Is there more specific detail on this?*

Section 3 of the rules contains information about vehicle specifications.

The Grand Challenge will be held in the southwest United States. DARPA will identify the location of the Grand Challenge 2005 Event during the summer of 2005.

9/27/04

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*Can you confirm that there is no application deadline until February 11, 2005?*

The first deadline in the Grand Challenge application process is February 11, 2005. Parts 1 & 2 are due on that date. Parts 3, 4, & 5 are due on March 11, 2005.

9/29/04

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*Team XYZ would like to know whether it is acceptable to have students employed under our federally-funded work-study program working on our project. These would be students who receive work-study as part of their financial aid package to attend the Univ. of XYZ and would be paid for constructing and maintaining the vehicle.*

Grand Challenge team members may not be paid by a federally-funded work study program to participate on a Grand Challenge team. However, students attending a university under such a program may participate on a Grand Challenge team if they do so on their own time.

9/30/04

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*After reading sections of the rules, they appear to be oriented toward wheeled vehicles. In particular, what relevance do braking, neutral gears, and towing have to strictly articulated walking vehicles? I assume that this type of UGV is valid as an eligible entry. Am I right?*

The Grand Challenge rules do not prohibit walking or legged vehicles. When published, the final rules will address your concern more clearly.

10/4/04

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*Does the vehicle have to be a land vehicle. The rules do not specify. Can it be mini aerial vehicle.*

Section 3.2 (Vehicle Limitations) of the Grand Challenge rules states, in part: The entry must be a ground vehicle that is propelled and steered principally by traction with the ground.

10/4/04

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*Hi, I have a question about the start of the race.*

*Is a vehicle suppose to be running, idling, at the gait and then when start time comes, the vehicle goes?*

*Or when it is time to start the race, the vehicle is powered up, have less than 5 min. for the vehicle to leave the start gait.*

Section 6.2 (Departure Area) of the Grand Challenge rules states, in part:

“When instructed to do so, each team must move its vehicle promptly to the start chute. ... Each vehicle must be enabled for autonomous operation within 5 minutes after entering the start chute. Vehicles must be prepared to wait in E-stop PAUSE mode in the start chute for up to 1 hour without manual intervention.

Before each start, an official places the vehicle in E-stop PAUSE mode. At the designated start time an official switches the E-stop from PAUSE to RUN and the vehicle must depart the start area promptly after the mandatory 5 second delay for the audible alarm.”

In order to give teams as much room as possible to innovate but to ensure efficient start area operations, the rules attempt to give a reasonable level of guidance in this section. For example, a requirement for the vehicle to be idling or running likely would not apply to an electrically-powered vehicle and might not be necessary for a hybrid vehicle. The rules do not require that a vehicle idles while waiting in the start chute as long as it is enabled for autonomous operation, is in E-stop PAUSE mode, and departs promptly when required.

If there is some question as to whether your particular approach, vehicle, or system is in doubt, you should submit as much detail as possible and explain what in particular is in question.

10/4/04

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*If an individual entrepreneur enters the 2005 Grand Challenge, is it acceptable to add others after the initial application? If so what is the final date for adding team members?*

*If team members change during before the competition trial does that disqualify the team?*

*These maybe questions that are already posted somewhere on your website I just missed them?*

It is acceptable to add team members after submitting parts 1 & 2 of the application. Currently, there is no cutoff date for changing the team roster.

10/4/04

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*Our team would like to have a Grand Challenge logo. We're putting together a press package and would like some vector artwork if at all possible, or a hi-res raster image. We would also like to use it on our vehicle.*

We send a high-resolution Grand Challenge logo (electronic file) to entrants that have submitted parts 1 & 2 of the application. You can find more information about the application process on our website at

<http://www.darpa.mil/grandchallenge/application.html>.

10/5/04

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*I am considering the use of a "wireless" torque sensor in an entry to the DARPA Grand Challenge. At the competitor's conference I recall a statement about "no wireless devices allowed on the vehicle." The following quote is from the manufacturer of the sensor:*

*"The system provides continuous power to the torque transmitter and strain gage located on the rotating shaft and it delivers continuous torque & horsepower data output using inductive, non-contact technology."*

<http://www.binsfeld.com/ttrevolution.cfm>

*Is the use of inductive technology to transmit strain (torque) information from a rotating shaft considered telemetry or wireless device and therefore a violation of the rules? I would like to avoid wear surfaces (brushes) to provide power/sensor output from a rotating shaft.*

The torque sensor you have described is allowed provided the sensor does not perform any wireless communications. Wireless sensing is not restricted.

10/6/04

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